

P32091

CLAIMS

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P32091

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52. (Added) A packets sending/receiving apparatus for sending  
sending packets and receiving reception packets, comprising:

authentication and key exchange means for  
producing an encryption key and a decoding key;

encryption means for producing an encryption sending  
data by encrypting sending data using the encryption key;

sending condition setting management means for  
producing sending condition setting information for setting  
sending condition of the sending packet using at least one  
of sending condition related information, sending/reception

P32091

management information, receiving condition setting information;

packetization means for producing the sending packet using the encryption sending data;

receiving condition setting management means for producing receiving condition setting information for setting receiving condition of the reception packets using at least one of receiving condition related information and packets reception information;

packets reception means for receiving the reception packets, which extracts reception data included in the reception packets from the reception packets using the receiving condition setting information and produces the packets reception information from the reception packets, and outputs the packets reception information to the authentication and key exchange means or the received condition setting management means;

decoding means for decoding the reception data using the decoding key;

first queue means for temporarily storing a first packets group produced at the packetization means;

second queue means for temporarily storing a second packets produced at the packetization means;

sending queue control means for controlling which of the first packets group stored in the first queue means and the second packets group stored in the second queue means is to be sent based on the sending condition setting information;

framing means for producing a sending frame by framing the first packet output from the first queue means and the second packets output from the second queue means; and

a frame reception means for extracting the reception packets from a reception frame,

P32091

wherein the sending queue control means controls the first queue means and the second queue means so as to output the second packets stored in the second queue means such that an amount of the second packets stored in the second queue means does not exceeds a predetermined amount.

53. (Added) A packets sending/receiving apparatus according to claim 52, wherein:

the packetization means includes first packetization means and second packetization means;

the first packetization means produces a first packets group using at least one of the sending condition setting information, and the authentication and key exchange related information;

the second packetization means produces the second packets group using at least one of the sending condition setting information, authentication and key exchange related information, and the encryption sending data.

54. (Added) A packet sending/receiving apparatus according to claim 53, wherein:

the packetization means converts the encryption sending data into a predetermined size and adds an IP header defined as IPv4 or IPv6 in IETF;

the first packetization means is formed of a software, and the second packetization means is formed of a hardware.

55. (Added) A packets sending/receiving apparatus according to claim 53, further comprising:

data separation means for separating the reception data into preferred data and general data;

the encryption means encrypts the preferred data;  
and

P32091

the first packetization means produces a first packet using the general data.

56. (Added) A packets sending/receiving apparatus according to claim 55, wherein the first packetization means adds at least one header of RTCP, RTSP, HTTP, TCP, UDP, and IP, which are data process protocols defined in the IETF document.

57. (Added) A packet sending/receiving apparatus according to claim 55, wherein the second packetization means adds a sequence number to data, or adds at least one header of RTP, UDP, HTTP, TCP, and IP, which are data process protocols defined in the IETF document.

58. (Added) A packet sending/receiving apparatus according to claim 55, wherein the preferred data is in an uncompressed SD format signal defined by SMPTE 259M standard, an uncompressed HD format defined by SMPTE 292M standard, a transmission stream format of DV or MPEG-TS by IEEE 1394 defined by IEC 61883 standard, MPEG-TS format by DVB-ASI, MPEG-PS format, MPEG-ES format, and MPEG-PES format, or a data file format.

59. (Added) A packets sending/receiving apparatus according to claim 55, wherein the sending queue control means controls the first queue means and the second queue means such that data rate of the preferred data does not become smaller than a predetermined value.

60. (Added) A packets sending/receiving apparatus according to claim 59, wherein the sending queue control means controls the first queue means and the second queue means such that the time for the preferred data to be stored in the second

P32091

queue means is always smaller than a predetermined value.

61. (Added) A packets sending/receiving apparatus according to claim 59, wherein:

the second packetization means includes a buffer means for temporarily storing data, a counter means for counting a length of the data, a packets header production means for producing packets header of the second packets group, and packets synchronization means for synchronizing packets by combining the packets header and a payload output from the buffer; and

the packets header production means specifies a payload length of the second packets group, reads out the data stored in the buffer means, and inputs to the packets synchronization means.

62. (Added) A packets sending/receiving apparatus according to claim 59, wherein:

the second packetization means includes buffer means for temporarily storing data extracted from the preferred data, counter means for counting a length of the data, packets header production means for producing packets headers using packetization information, and packets production means for producing packets by combining the packets header and a payloads; and

the counter means outputs control data for reading out data which corresponds to a payload length from the buffer means.

63. (Added) A packets sending/receiving apparatus according to claim 59, wherein:

the second packetization means includes buffer means for temporarily storing data, counter means for counting

P32091

a length of the data, packets header production means for producing packets headers using packetization information, error correction addition means for adding error correction to the data, and packets synchronization means for synchronizing the packets header and the data with the error correction added; and

the counter means outputs control data for reading out data which corresponds to a payload length from the buffer means.

64. (Added) A packets sending/receiving apparatus according to claim 59, wherein, in a layer for processing a reception frame of a layer lower than layers on which the preferred data and the general data are processed, the preferred data and the general data are selected from the communication protocol header of the reception packets included in the reception frame, and a process for the preferred data and a process for the general data are independently performed.

65. (Added) A packets sending/receiving apparatus according to claim 53, wherein the second packetization means includes error correction code addition means.

66. (Added) A packets sending/receiving apparatus according to claim 65, wherein a scheme of the error correction code used in the error correction code addition means is Reed-Solomon scheme or parity scheme.

67. (Added) A packets sending/receiving apparatus according to claim 53, wherein information indicating the encryption key outputs decoding information of the encryption key from the framing means before the sending packets encrypted with the encryption key is output in the framing means.

P32091

68. (Added) A packets sending/receiving apparatus according to claim 67, wherein information indicating the encryption key is sent before the time of reception of a reception frame which corresponds to the sending frame from sending of the sending frame with respect to the time when the sending packets including the encryption sending data produced using the encryption key is sent.

69. (Added) A packets sending/receiving apparatus according to claim 53, wherein the second packetization means includes encryption switching means, inputs an encryption key to be input to the encryption key switching means to the encryption means while switching the encryption key at a specified timing, and switches the encryption key in the encryption means in a specified interval.

70. (Added) A packets sending/receiving apparatus according to claim 69, wherein timing used for the encryption key switching is timing generated in synchronization with a predetermined sequence number in a packet header, which is an output for the packet header production means.

71. (Added) A packets sending/receiving apparatus according to claim 69, wherein the timing for the authentication and key exchange means to update the decoding key is updated for every HTTP request when the sending packets uses HTTP.

72. (Added) A packets sending/receiving apparatus according to claim 69, wherein the timing for the authentication and key exchange means to update the decoding key is changed for every certain amount of data when the sending packets uses HTTP.



P32091

73. (Added) A packets sending/receiving apparatus according to claim 69, wherein timing for the authentication and key exchange means to update the decoding key is updated within a predetermined period when the sending packets uses RTP.

74. (Added) A packets sending/receiving apparatus according to claim 69, wherein timing used for the encryption key switching is timing generated in synchronization with an endpoint and a start point of an error correction matrix.

75. (Added) A packets sending/receiving apparatus according to claim 52, wherein the sending queue control means controls which of the first packets group stored in the first queue means and the second packets group stored in the second queue means is to be sent using at least one of information regarding a sending path of the first packets group or the second packets group, information regarding a bandwidth required for sending the first packets group or the second packets group, information regarding delay from sending to arrival of the sending packets, and information regarding priority of the first packets group or the second packets group.

76. (Added) A packets sending/receiving apparatus according to claim 75, wherein the sending queue control means uses one of control schemes of RSVP scheme described with IETF rfc2205, rfc2208, rfc2209, Intserv scheme described with IETF rfc2210, rfc2211, 2212, rfc2215, and Diffserv scheme described with IETF rfc2474, rfc2475, rfc2597, rfc2598.

77. (Added) A packets sending/receiving apparatus according to claim 52, wherein the sending queue control means controls

P32091

the first queue means and the second queue means so as to select one of the first packets group stored in the first queue means and the second packets group stored in the second queue means is to be sent and preferentially outputs the selected packets.

78. (Added) A packets sending/receiving apparatus according to claim 52, wherein the sending queue control means controls the first queue means and the second queue means so as to average intervals between the first packets group sent from the first queue means and the second packets sent from the second queue means.

79. (Added) A packets sending/receiving apparatus according to claim 52, wherein the receiving condition setting management means and the receiving condition setting management means detect the maximum transmission packet size in a path from a sending destination of the sending packet and a receiving address between sending and arrival of the sending frame, and produces the sending condition setting information and the receiving condition setting information using the maximum transmission packet size information.

80. (Added) A packets sending/receiving apparatus according to claim 52, wherein the framing means adds a frame header of IEEE 802.3 standard to a sending packets produced in the packetization frame.

81. (Added) A packets sending/receiving apparatus according to claim 52, wherein the framing means adds a frame header of IEEE 802.1Q standard to sending packets produced in the packetization frame.

P32091

82. (Added) A packets sending/receiving apparatus according to claim 52, wherein the packetization means converts the encryption sending data to a predetermined size and adds Internet Protocol (IP) header defined as IPv4 or IPv6 in IETF.

83. (Added) A packets sending/receiving apparatus according to claim 52, wherein the packetization means adds information indicating that it is preferred packets to a service type field of IPv4 header or a type of service (TOS) field in the service type field.

84. (Added) A packets sending/receiving apparatus according to claim 52, wherein the packetization means adds information indicating that it is preferred packets to a priority field of IPv6 header.

85. (Added) A packets sending/receiving apparatus according to claim 52, wherein the authentication and key exchange means permits authentication when location information of the packets sending/receiving apparatus, and location information of the destination of the sending packets or location information of the sending source of the reception packets match predetermined conditions.

86. (Added) A packets sending/receiving apparatus according to claim 85, wherein the sending/receiving management information includes at least one of the location information of the packets sending/receiving apparatus, and the location information of the destination of the sending packets or the location information of the sending source of the reception packets match predetermined conditions.

P32091

87. (Added) A packets sending/receiving apparatus according to claim 86, wherein the location information is information with area specified by a region code, address, postal code, or longitude and latitude.

88. (Added) A packets sending/receiving apparatus according to claim 85, wherein the authentication and key exchange means includes:

storage means for temporarily storing information regarding the destination of the sending packets or sending source of the reception packets when authentication is performed between the packets sending/receiving apparatus to the destination of the sending packets or sending source of the reception packets; and

verifying means for verifying the information stored in the storage means and the information regarding the destination of the sending packets or the information regarding the sending source of the reception packets when the authentication is not confirmed since the packets sending/receiving apparatus and the destination of the sending packets or sending source of the reception packets do not match the predetermined conditions, and performing authentication between the packets sending/receiving apparatus and the destination of the sending packets or sending source of the reception packets.

89. (Added) A packets sending/receiving apparatus according to claim 88, the information regarding the destination of the sending packets or the information regarding the sending address of the reception packets includes at least one of a certificate, MAC address and biometric information.

90. (Added) A packets sending/receiving apparatus according

P32091

to claim 52, wherein the authentication and key exchange means performs predefined authentication and key exchange and updates encryption key or decoding key in a predetermined period.

91. (Added) A packets sending/receiving apparatus according to claim 90, wherein timing information for indicating timing for the authentication and key exchange means to update the decoding key is added to the sending packets.

92. (Added) A packets sending/receiving apparatus according to claim 90, wherein the timing for the authentication and key exchange means to update the decoding key is changed for every certain amount of data when the sending packets uses HTTP.

93. (Added) A packets sending/receiving apparatus according to claim 90, wherein the timing for the authentication and key exchange means to update the decoding key is updated within a predetermined period when the sending packets uses RTP.

94. (Added) A packets sending/receiving apparatus for sending a sending packets and receiving a reception packets, comprising:

authentication and key exchange means for producing an encryption key and a decoding key;

encryption means for producing an encryption sending data by encrypting sending data using the encryption key;

sending condition setting management means for producing sending condition setting information for setting sending condition of the sending packets using at least one of sending condition related information, sending/reception

P32091

management information, receiving condition setting information;

packetization means for producing the sending packets using the encryption sending data;

receiving condition setting management means for producing receiving condition setting information for setting receiving condition of the reception packets using at least one of receiving condition related information and packets reception information;

packets reception means for receiving the reception packets, which extracts reception data included in the reception packets from the reception packets using the receiving condition setting information and produces the packets reception information from the reception packets, and outputs the packets reception information to the authentication and key exchange means or the received condition setting management means; and

decoding means for decoding the reception data using the decoding key, wherein

the authentication and key exchange means permits authentication when location information of the packets sending/receiving apparatus, and location information of the destination of the sending packets or location information of the sending source of the reception packets match predetermined conditions, and

the authentication and key exchange means permits authentication when a propagation time of one-way or a round trip from the packets sending/receiving apparatus to the destination of the sending packets or sending source of the reception packets is shorter than a predetermined limit time between the packets sending/receiving apparatus and the destination of the sending packets or sending source of the reception packets.

P32091

95. (Added) A packets sending/receiving apparatus for sending sending packets and receiving reception packets, comprising:

authentication and key exchange means for producing an encryption key and a decoding key;

encryption means for producing an encryption sending data by encrypting sending data using the encryption key;

sending condition setting management means for producing sending condition setting information for setting sending condition of the sending packets using at least one of sending condition related information, sending/reception management information, receiving condition setting information;

packetization means for producing the sending packets using the encryption sending data;

receiving condition setting management means for producing receiving condition setting information for setting receiving condition of the reception packets using at least one of receiving condition related information and packets reception information;

packets reception means for receiving the reception packets, which extracts reception data included in the reception packets from the reception packets using the receiving condition setting information and produces the packets reception information from the reception packets, and outputs the packets reception information to the authentication and key exchange means or the received condition setting management means; and

decoding means for decoding the reception data using the decoding key, wherein

the authentication and key exchange means permits authentication when location information of the packets

P32091

sending/receiving apparatus, and location information of the destination of the sending packets or location information of the sending source of the reception packets match predetermined conditions, and

the authentication and key exchange means permits authentication, in the case where there is a wireless transmission zone in a sending/reception zone between the packets sending/receiving apparatus and the destination of the sending packets or sending source of the reception packets, when it is confirmed that it is in a mode for scrambling and transmitting data in the wireless transmission zone.

96. (Added) A packets sending/receiving apparatus for sending sending packets and receiving reception packets, comprising:

authentication and key exchange means for producing an encryption key and a decoding key;

encryption means for producing an encryption sending data by encrypting sending data using the encryption key;

sending condition setting management means for producing sending condition setting information for setting sending condition of the sending packets using at least one of sending condition related information, sending/reception management information, receiving condition setting information;

packetization means for producing the sending packet using the encryption sending data;

receiving condition setting management means for producing receiving condition setting information for setting receiving condition of the reception packets using at least one of receiving condition related information and packets reception information;

packets reception means for receiving the reception



P32091

packets, which extracts reception data included in the reception packets from the reception packets using the receiving condition setting information and produces the packets reception information from the reception packets, and outputs the packets reception information to the authentication and key exchange means or the received condition setting management means; and

decoding means for decoding the reception data using the decoding key, wherein

the authentication and key exchange means performs predefined authentication and key exchange and updates an encryption key or decoding key in a predetermined period, and

the timing for the authentication and key exchange means to update the decoding key is notified by changing a TCP port number, or UDP port number of the sending packets.

97. (Added) A packets sending/receiving apparatus for sending sending packets and receiving reception packets, comprising:

authentication and key exchange means for producing an encryption key and a decoding key;

encryption means for producing an encryption sending data by encrypting sending data using the encryption key;

sending condition setting management means for producing sending condition setting information for setting sending condition of the sending packets using at least one of sending condition related information, sending/reception management information, receiving condition setting information;

packetization means for producing the sending packets using the encryption sending data;

receiving condition setting management means for

P32091

producing receiving condition setting information for setting receiving condition of the reception packets using at least one of receiving condition related information and packets reception information;

packets reception means for receiving the reception packets, which extracts reception data included in the reception packets from the reception packets using the receiving condition setting information and produces the packets reception information from the reception packets, and outputs the packets reception information to the authentication and key exchange means or the received condition setting management means; and

decoding means for decoding the reception data using the decoding key, wherein

the authentication and key exchange means performs predefined authentication and key exchange and updates encryption key or decoding key in a predetermined period, and

the timing for the authentication and key exchange means to update the decoding key is updated for every HTTP request when the sending packets uses HTTP.

98. (Added) A packets sending/receiving apparatus for sending sending packets and receiving reception packets, comprising:

authentication and key exchange means for producing an encryption key and a decoding key;

encryption means for producing an encryption sending data by encrypting sending data using the encryption key;

sending condition setting management means for producing sending condition setting information for setting sending condition of the sending packets using at least one of sending condition related information, sending/reception

P32091

management information, receiving condition setting information;

packetization means for producing the sending packets using the encryption sending data;

receiving condition setting management means for producing receiving condition setting information for setting receiving condition of the reception packets using at least one of receiving condition related information and packets reception information;

packets reception means for receiving the reception packets, which extracts reception data included in the reception packets from the reception packets using the receiving condition setting information and produces the packets reception information from the reception packets, and outputs the packets reception information to the authentication and key exchange means or the received condition setting management means; and

decoding means for decoding the reception data using the decoding key, wherein

the authentication and key exchange means performs predefined authentication and key exchange and updates encryption key or decoding key in a predetermined period, and

copy control information of DTCP scheme in the authentication and key exchange means is transmitted by adding encryption mode information to the reception packets.

